



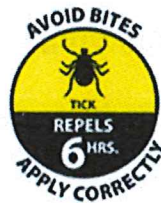
Don't Let One Bite Change Your Life...



A Guide to the use of Tick Repellents

The use of repellents can be a highly effective way to prevent tick bites and reduce the risk of getting any number of tick-borne diseases including Lyme, babesiosis and anaplasmosis.

Beginning in 2015 manufacturers will have the option of using images developed by the EPA to place on product packaging. The intent is to communicate the effectiveness of the product. Note, these images illustrate the effectiveness of repellents applied to skin:



Consumers should follow all label directions concerning application.

Deet - The most widely available active ingredient on the market. Protection times 1–10 hours. Product concentrations 7–100%.

American Acad. Pediatrics and Centers Disease Control: "Recommendation for children older than 2 months of age is to use 10% to 30% DEET. DEET should not be used on children younger than 2 months of age."

Ex: *Cutter, OFF!, 3M Ultrathon*

Picaridin - Synthetic version of piperine, a chemical found in black pepper.

Protection times 6–8 hours. Product concentrations 10–20%.

Ex: *Avon Skin-So-Soft Bug Guard, Cutter Advanced, Natrapel*

IR3535 - Beta-alanine, synthetic version of an amino acid. Protection times 2–12 hours. Product concentrations 7–20%.

Ex: *Avon Skin-So-Soft, Coleman Skin Smart*

Oil of Lemon Eucalyptus - Modified version of a natural plant oil. Protection time 6 hours. Product concentrations 30 – 40%. FDA: “Oil of lemon eucalyptus products should not be used on children under 3 years of age.”

Ex: *Citrapel, Coleman Botanicals, Repel Essential*

“Herbal” or Botanicals – A number of repellent products contain plant oils such as peppermint, lemongrass, cedar, rosemary and others. Their effectiveness against ticks or mosquitoes is questionable. They may contain allergens; they are not EPA registered.

Permethrin - For application to clothing, including footwear., NOT skin. Highly effective at repelling/killing ticks. Effectiveness lasts through multiple washings. Pre-treated clothing is also on the market. This is a good complement to skin-applied repellents. EPA’s position is that treated clothing poses no immediate or long-term effects to toddlers, children, pregnant women or nursing mothers.

There are a number of permethrin products designed for different applications. Consumer should be careful to select product specially formulated for application to outerwear/camping gear.

Ex: *Ben’s, Coleman, Sawyer*

Pet precautions - These products should not be applied to pets, as they lick their fur. Use only products formulated for them. Good to check with veterinarian.

EPA skin repellent selector tool:

<http://www2.epa.gov/insect-repellents/find-insect-repellent-right-you>

Repellent products may be found at garden centers, sporting goods/camping outfitters, some “box” stores, hardware stores.

2015

Cape Cod Cooperative Extension
Barnstable County Dept Health & Environment

Larry Dapsis, Entomologist 508-375-6642

Lyme Disease Surveillance in Massachusetts, 2013

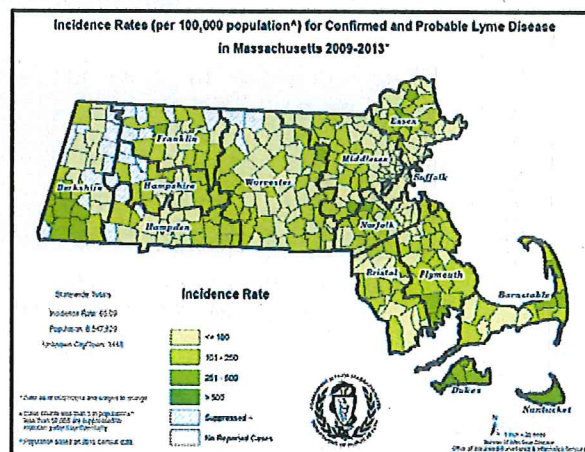
Massachusetts Department of Public Health

2013 Surveillance Highlights

- 4,080 confirmed Lyme disease cases and 1,585 probable cases were reported in Massachusetts in 2013 (total = 5,665), an increase of 12% from the number of confirmed and probable cases reported in 2012 (total=5,050).
- The highest incidence rates were among children aged 5-9 years and adults aged 65-74 years. The majority of cases had onsets in June, July, and August.
- 72% of confirmed cases reported an erythema migrans ("bull's-eye") rash.
- MDPH was unable to classify approximately 25% of all cases reported during 2013 due to insufficient clinical information.

The map to the right illustrates Lyme disease incidence rates (number of cases per 100,000 people) by city and town in Massachusetts from 2009-2013. It includes both probable and confirmed cases. The darker the shading, the higher the incidence.

Lyme disease is considered endemic in all of Massachusetts. Areas of high incidence include much of the eastern half of the state. Regions of particularly high incidence include Plymouth, Cape Cod and the Islands, and some areas in Middlesex, Essex, and southern Berkshire Counties. More isolated areas of high incidence occur in Franklin, Hampshire and Worcester Counties



County	2013 Confirmed Cases (#)	2013 Probable Cases (#)	Combined Incidence Rate for Confirmed and Probable Cases
Barnstable	186	88	127
Berkshire	84	46	99
Bristol	413	162	105
Dukes	32	38	423
Essex	405	154	75
Franklin	51	20	100
Hampden	167	57	48
Hampshire	112	35	93
Middlesex	720	267	66
Nantucket	47	16	619
Norfolk	460	150	91
Plymouth	631	233	175
Suffolk	81	49	18
Worcester	480	194	84
Unknown	211	76	-
State Total	4,080	1,585	65.09

Figure 1

Data as of 20MAY2014 and subject to change.

The chart to the left shows the number and incidence rates of confirmed and probable cases, by county, per 100,000. Incidence rates of confirmed and probable cases in 2013 were higher for most counties, compared with 2012. Exceptions included Dukes County, where the incidence rate decreased from 502 to 423 per 100,000 and Suffolk County, which remained stable at around 18 per 100,000. Year to year variations may not be as significant as observing trends over time (see Figure 3).

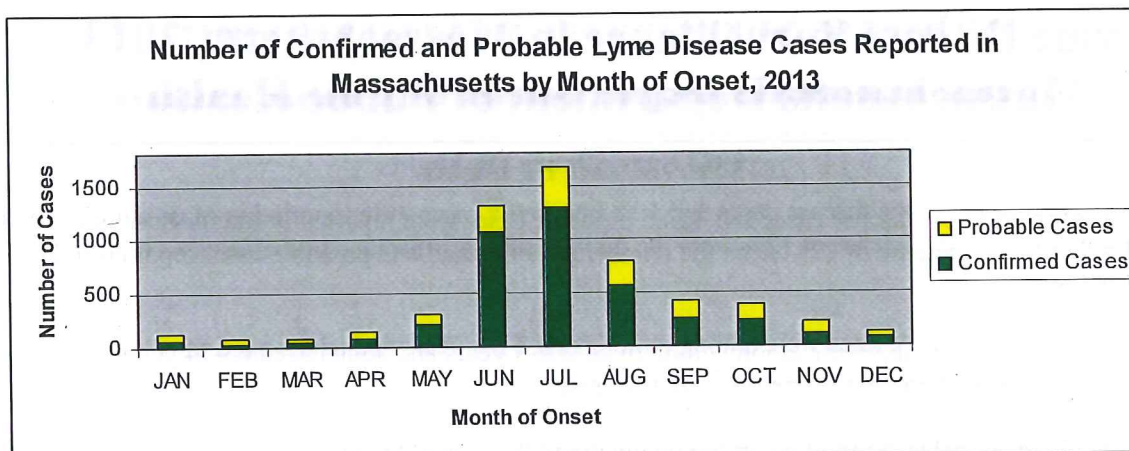


Figure 2

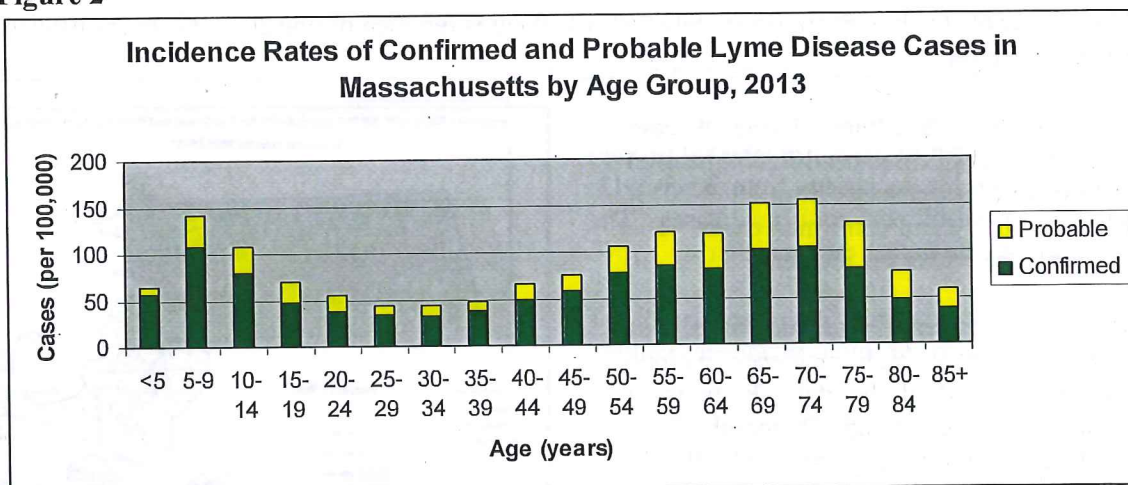
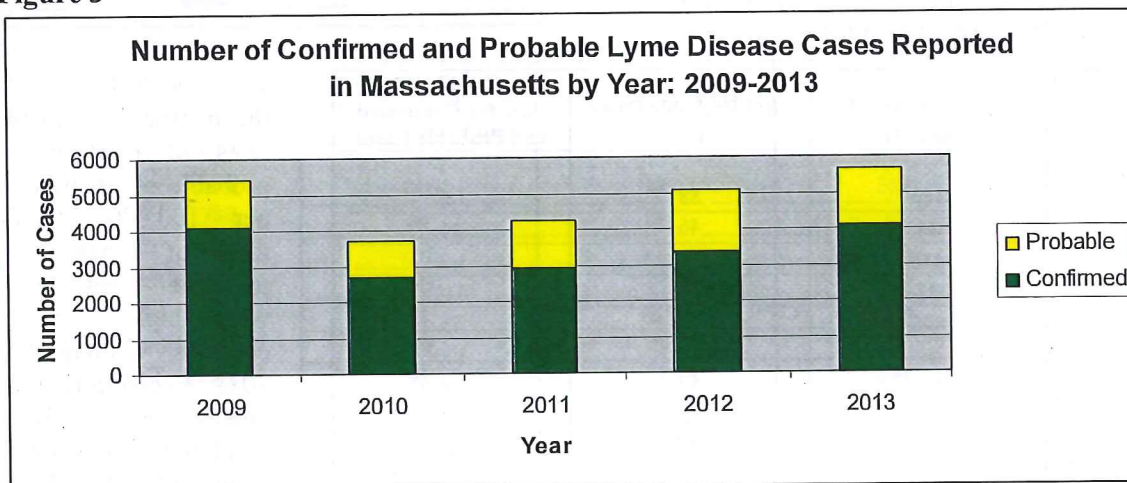


Figure 3



Data as of 20MAY2014 and subject to change.

Babesiosis Surveillance in Massachusetts, 2014

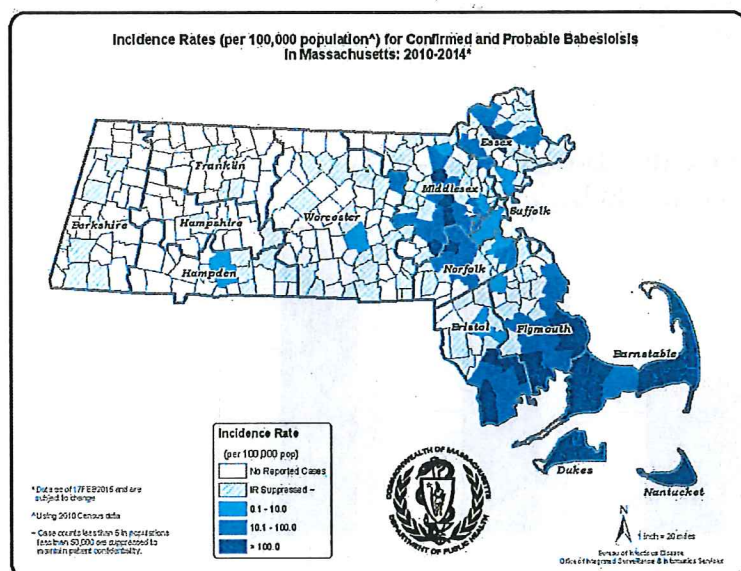
Massachusetts Department of Public Health

Investigation of suspect cases of babesiosis, and the collection of clinical and exposure data by local public health, enables MDPH to analyze trends and provide this surveillance summary.

2014 Surveillance Highlights

- ✱ 520 confirmed and probable cases of babesiosis were reported in Massachusetts in 2014. This was a 24% increase over the number of cases reported in 2013. Overall, 932 suspect cases of babesiosis were investigated.
- ✱ Statewide, babesiosis incidence increased from 6.4 to 7.9 cases per 100,000 residents and the incidence in Barnstable, Bristol, Dukes and Nantucket, and Plymouth counties increased substantially. Counties with the highest incidence continued to be Barnstable, Plymouth, Dukes and Nantucket. Bristol County had the greatest change in incidence, from 4.9 to 11.5 cases per 100,000 residents.
- ✱ The majority of cases occurred in June, July and August, with only 26% of cases reporting awareness of a recent tick bite.
- ✱ People over the age of 60 years of age continue to be at greatest risk for clinical disease (54% of all patients identified with babesiosis were over 60), and 67% of all cases were male.
- ✱ Approximately one out of three (32%) cases reported with babesiosis was hospitalized. The symptoms most commonly reported included fatigue (76%), fever (70%), malaise (61%), chills (53%), and muscle aches and pain (50%). There was at least one fatality.
- ✱ Ten confirmed cases (2 %) had received a blood transfusion in the six months prior to becoming ill.
- ✱ For more information about babesiosis and other tick-borne diseases, including things you can do to keep you and your loved ones safe, please visit www.mass.gov/dph/tick.

The map below illustrates babesiosis incidence rates per 100,000 by city and town of residence in Massachusetts for 2010-2014. Areas of highest incidence include southern Middlesex County, parts of Essex County, Cape Cod, Southeastern Massachusetts and the islands of Nantucket and Martha's Vineyard.



County	2014 Cases Confirmed and Probable	2014 Incidence Rate (per 100,000)
Barnstable	130	60.2
Berkshire	2	1.5
Bristol	63	11.5
Dukes and Nantucket	56	209.7
Essex	32	4.3
Franklin	0	0.0
Hampden	8	1.7
Hampshire	3	1.9
Middlesex	66	4.4
Norfolk	38	5.7
Plymouth	98	19.8
Suffolk	8	1.1
Worcester	14	1.8
State Total	520	7.9

*Statistics for Dukes and Nantucket counties are combined in accordance with confidentiality guidelines

Data as of 3Feb2015 and are subject to change.

Figure 1.

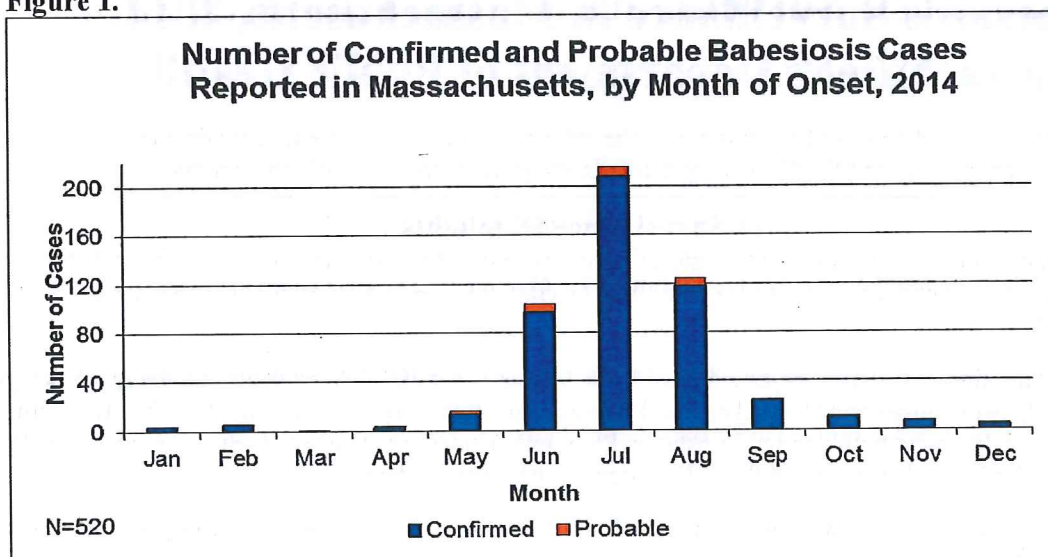


Figure 2.

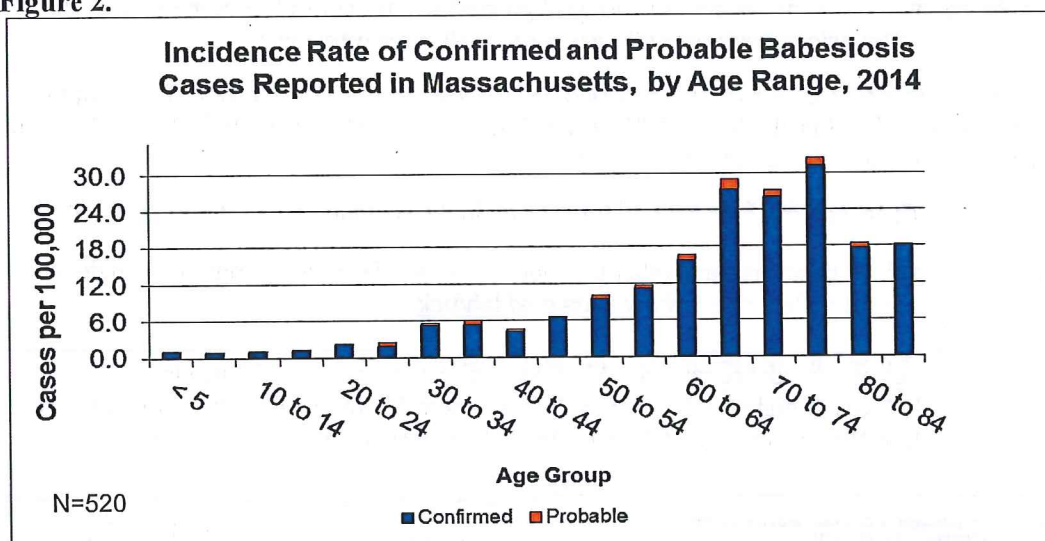
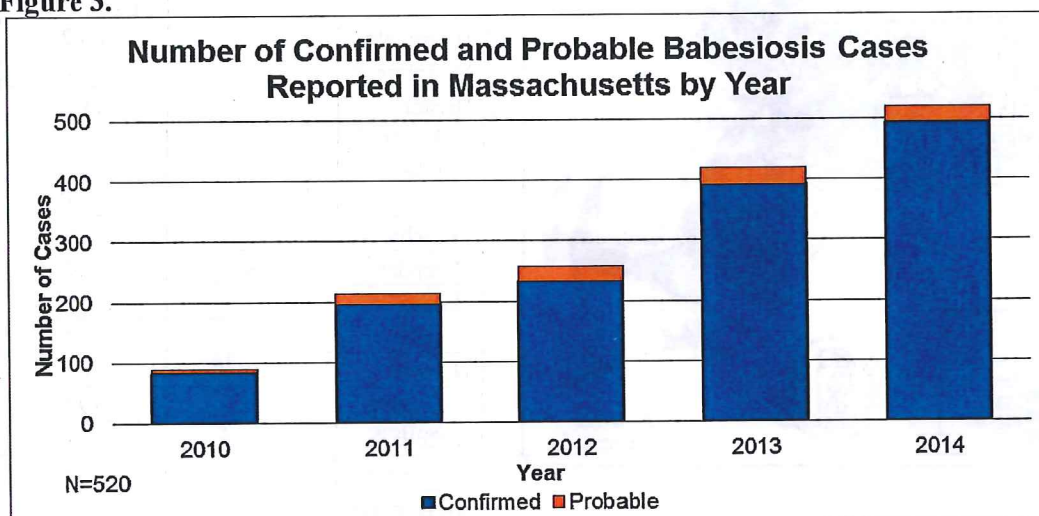


Figure 3.



Data as of 3Feb2015 and are subject to change.

Borrelia miyamotoi

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What is *Borrelia miyamotoi*?

Borrelia miyamotoi is a bacterium (germ) that can be spread by tiny, infected deer (black-legged) ticks. These bacteria have only recently been discovered as a cause of some human illness.

Where do cases of *Borrelia miyamotoi* infection occur?

Borrelia miyamotoi was identified in deer ticks in New England in 2001, and has also been found in these ticks in the upper Midwest and in similar ticks in California, Europe and Russia.

How are the bacteria spread?

Like Lyme disease, *Borrelia miyamotoi* is spread by the bite of an infected deer tick. Deer ticks in Massachusetts can also carry the germs that cause babesiosis, human granulocytic anaplasmosis (previously known as human granulocytic ehrlichiosis) and Powassan virus. Deer ticks are capable of spreading more than one type of germ in a single bite.

When can I get *Borrelia miyamotoi*?

Young ticks (nymphs) are most active during the warm weather months between May and July. Adult ticks are most active during the fall and spring but will also be out searching for a host any time that winter temperatures are above freezing.

Is this disease common?

It is not yet known how common this disease is in Massachusetts. Results from a recent study suggest that this is an infrequent cause of illness occurring during the late spring and summer peak tick season.

What are the symptoms of infection with *Borrelia miyamotoi*?

Human infections with *B. miyamotoi* were first described in 2011 in Russia. Most of the patients had fever, headache, and muscle aches. Symptoms similar to those of Lyme disease, such as the erythema migrans rash (bull's-eye rash), arthritis or facial palsy were uncommon. Information from cases in the United States is similar, and all reported patients recovered.

Is there treatment for disease caused by *Borrelia miyamotoi*?

Infection with *Borrelia miyamotoi* can be treated with two weeks of antibiotics.

Did you know?

You don't have to be a hiker on Cape Cod to worry about ticks. In Massachusetts, you can be bitten in your own back yard. There are lots of things you can do around your own backyard to make it less inviting for ticks! Visit the MDPH Tickborne Disease Website at <http://www.mass.gov/dph/tick> for suggestions.



What can I do to lower my chances of getting any disease from ticks?

Prevention begins with you! Take steps to reduce your chances of being bitten by any tick. Ticks are most active during warm weather, generally late spring through fall. However, ticks can be out any time that temperatures are above freezing. Ticks cling to vegetation and are most numerous in brushy, wooded or grassy habitats. They are not found on open, sandy beaches, but may be found in grassy dune areas. When you are outside in an area likely to have ticks (e.g. brushy, wooded or grassy places), follow these simple steps to protect yourself and your loved ones:

- Use a repellent with **DEET** (the chemical N-N-diethyl-meta-toluamide) or **permethrin**. Repellents containing DEET should not be used on children less than 2 months of age and should be used in concentrations no higher than 30% on older children. Permethrin products are intended for use on items such as clothing, shoes, bed nets and camping gear and should not be applied to skin. More information on choosing a repellent and how to use repellents safely is included on the MDPH Public Health Fact Sheet on Tick Repellents at <http://www.mass.gov/eohhs/docs/dph/cdc/factsheets/tick-repellents.pdf>
- Wear long, light-colored pants tucked into socks or boots, and a long-sleeved shirt. This may be tough to do when the weather is hot, but it will help keep ticks away from your skin and help you spot a tick on your clothing faster.
- Stay on trails when walking or hiking, avoiding the edge habitat where ticks are likely to be.
- Showering immediately after potential tick exposure may help remove unattached ticks.
- Talk to your veterinarian about tick control options (tick collars, repellents) for your pets.

After spending time in an area likely to have ticks, check yourself, your children and pets for ticks. Young ticks, called nymphs, are the size of a poppy seed. Adult deer ticks are the size of a sesame seed. Both nymph and adult deer ticks can spread diseases ticks carry; however, nymphs are often of more concern. They are aggressive feeders and so tiny that it can be difficult to see them on the body, unless you are looking carefully. When doing a tick check, remember that ticks like places that are warm and moist. Always check the back of the knees, armpits, groin, scalp, back of the neck and behind the ears. If you find a tick attached to your body, remove it as soon as possible using a fine-point tweezers. Do not squeeze or twist the tick's body, but grasp it close to your skin and pull straight out with steady pressure.

Know the symptoms of tick-borne disease. If you have been someplace likely to have ticks and you develop symptoms of any disease carried by ticks, see your health care provider right away.

Where can I get more information?

- **For questions about your own health**, contact your doctor, nurse, or clinic
- **For questions about diseases spread by ticks**, contact the MDPH at (617) 983-6800 or toll free at (888) 658-2850 or online at www.mass.gov/dph/tick. You may also contact your local Board of Health (listed in the telephone directory under "Government").
- **Health effects of pesticides**, MDPH, Bureau of Environmental Health at 617-624-5757.



Massachusetts Department of Public Health Tick-borne Disease Website



<http://www.mass.gov/dph/tick>



Powassan virus

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What is Powassan virus?

Powassan virus causes a rare, but often serious disease, and is spread by the bite of tiny, infected deer (black-legged) ticks. There are two types of Powassan virus in the United States. One type is found in ticks that normally feed on woodchucks (groundhogs); the second type is carried by deer ticks, the same ticks that can also carry the germs that cause Lyme disease, babesiosis and anaplasmosis.

Where do cases of Powassan virus disease occur?

Although only about 50 cases of Powassan infection have been reported in the last 10 years in the United States, most of those cases have occurred in the Northeast and the Upper Midwest. There have been cases of Powassan virus infection in Massachusetts in the last 10 years.

How is Powassan virus spread?

Powassan virus is spread by the bite of an infected tick. In Massachusetts, the deer tick is the type of tick most likely to carry this infection. While ticks must be attached for a certain length of time before they can spread most infections, there is some evidence that Powassan virus can spread from the tick into a person after only a short time of attachment.

When am I at risk from Powassan virus?

Cases of Powassan virus disease can occur any time ticks are active. Young ticks (nymphs) are most active during the warm weather months between May and July. Adult ticks are most active during the fall and spring, but may also be out searching for a host any time that winter temperatures are above freezing.

How soon do symptoms of disease appear after a tick bite?

Symptoms of disease usually begin between one week and one month after the bite of an infected tick.

What are the symptoms of Powassan virus disease?

Although most people who are exposed to Powassan virus likely never feel ill, others may become severely ill with meningitis (inflammation of the covering of the brain and spinal cord) or encephalitis (inflammation of the brain). Signs and symptoms include fever, headache, vomiting, weakness, confusion, loss of coordination, speech difficulties and seizures. Approximately 10% of people with this severe form of the disease will die and survivors may have long-term health problems.

Is there treatment for Powassan virus disease?

There is no specific treatment once infection with Powassan virus has occurred. Treatment consists of supportive care, rest and fluids to prevent dehydration.

Did you know?

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Massachusetts Department of Public Health Tick-borne Disease Website



<http://www.mass.gov/dph/tick>



Looking for a bull's-eye rash? Look again – erythema migrans can take many forms.



Most people do not see the tick that causes their Lyme disease. However, approximately 75% of patients with early Lyme disease will have the telltale skin lesion in the first 1-4 weeks of infection. The Lyme disease skin lesion is large, greater than 5 cm (2 inches), in size. It can be distinguished from an uninfected tick or bug bite because it lasts days or weeks and enlarges in size over time. When the skin lesion is present, it is a more accurate way to diagnose Lyme disease than by using the currently available blood tests.

Most clinicians recognize the classic target lesion or bull's-eye rash. However, most are not aware that the majority of Lyme disease skin lesions are uniformly red or reddish-blue. In late spring and early summer when early Lyme disease is most prevalent, any of the skin lesions shown here could be indicative of Lyme disease. Fever, chills, and muscular pain in the neck and extremities are common early Lyme disease symptoms. The presence of these symptoms with a rash should raise the suspicion of a Lyme disease diagnosis.



Central Clearing/Target Lesions

The classic bull's-eye target lesion of Lyme disease occurs in the minority of patients. The majority of Lyme disease skin lesions lack the hallmark rings and central clearing. **Only about 20% of Lyme disease lesions have a bull's-eye appearance.**



Uniformly Red Lesions

Most Lyme disease skin lesions are uniformly red without the rings or target appearance. They are distinguished from other skin rashes by their round or oval shape and sharply demarcated borders. Skin lesions often hide in difficult to see places such as behind the knee or in the groin or armpit.



Blistering Lesions - It's not a spider bite.

1% of Lyme disease skin lesions have a central blistering or pustular appearance that is commonly mistaken for a spider bite. Why does this occur? It is likely a more severe inflammatory reaction to *Borrelia burgdorferi* that results in skin blistering.



Blue-Red Lesions

Some Lyme disease skin lesions have a blue-purple color and can be mistaken for a bruise. What distinguishes this from a bruise? The perfectly uniform circle and sharply demarcated border. They may be minimally pruritic or sensitive to touch but are not pruritic like poison ivy or extremely painful like shingles or cellulitis.



Disseminated Lesions

These are not multiple tick bites. The original skin infection of Lyme disease can spread through the bloodstream to other areas of the body, including the joints, nervous system and other areas of the skin. This results in multiple skin lesions that often have variable shapes and appear throughout different areas of the skin.

How to differentiate Lyme disease from other causes of fever and rash.

While viral illnesses and other bacterial infections can cause symptoms of fever, fatigue, and pain that mimic Lyme disease, they do not have large distinct round or oval rashes like Lyme disease. In addition, most viral illnesses have typical cold symptoms of runny nose or prominent cough which are not common in Lyme disease.

Human Granulocytic Anaplasmosis (HGA)

Surveillance in Massachusetts, 2013

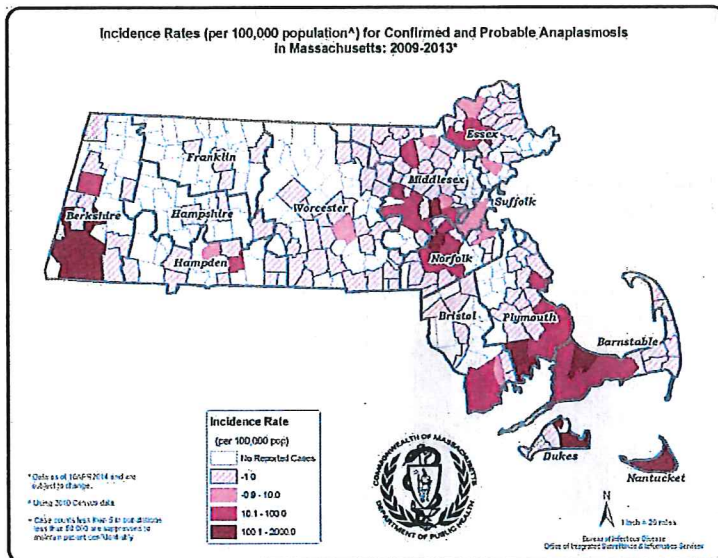
Massachusetts Department of Public Health (MDPH)

Investigation of suspect cases of HGA, and the collection of clinical and exposure data by local public health enables MDPH to analyze trends and provide this surveillance summary.

2013 Surveillance Highlights

- 329 confirmed and probable cases of HGA were reported in Massachusetts in 2013, about the same number of cases as was reported in 2012. Overall 990 suspect cases were investigated.
- Regions with the highest incidence included southern Berkshire County, as well as Cape Cod and the Islands of Nantucket and Martha's Vineyard.
- The highest number of confirmed cases occurred in May, June, and July. Only 34% of confirmed cases reported that they had a recent tick bite.
- People over the age of 60 years continue to be at greatest risk for clinical disease (48% of patients identified with HGA are over 60) and half (49%) of all cases were male.
- One out of three patients with HGA (34%) was hospitalized. The average age of hospitalized cases was 63 years. There was at least one fatality.
- The most common symptoms reported in confirmed or probable cases included fever (97%), malaise (81%), and muscle aches and pain (72%).
- For more information about HGA and other tick-borne diseases, including things you can do to keep you and your loved ones safe, please visit www.mass.gov/dph/tick.

The map below illustrates HGA incidence rates per 100,000 by city and town of residence in Massachusetts from 2009-2013. Areas of highest incidence include southern Berkshire County, Southeastern Massachusetts, and Cape Cod and the Islands. Southern Middlesex County and Norfolk County both had isolated areas of elevated incidence. All counties reported cases of HGA in 2013.



County	2013 Cases Confirmed and Probable	2013 Incidence Rate per 100,000
Berkshire	55	41.91
Bristol	16	2.92
Cape Cod & Islands*	37	15.25
Essex	27	3.63
Franklin	6	8.41
Hampden	7	1.51
Hampshire	2	1.27
Middlesex	67	4.46
Norfolk	43	6.41
Plymouth	45	9.09
Suffolk	11	1.52
Worcester	13	1.63
State Total	329	5.0

*Statistics for Barnstable, Dukes and Nantucket counties are combined in accordance with confidentiality guidelines

Figure 1.

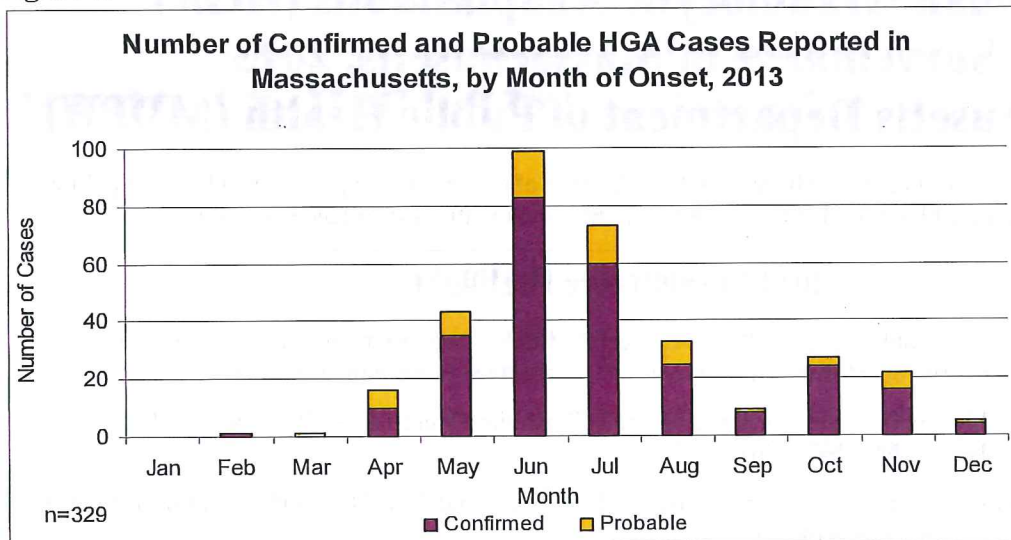


Figure 2.

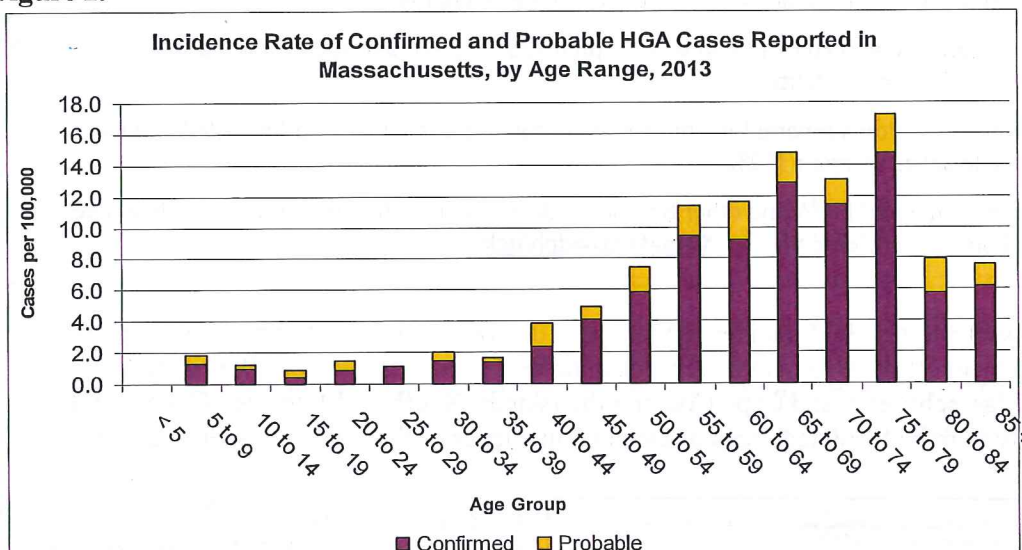
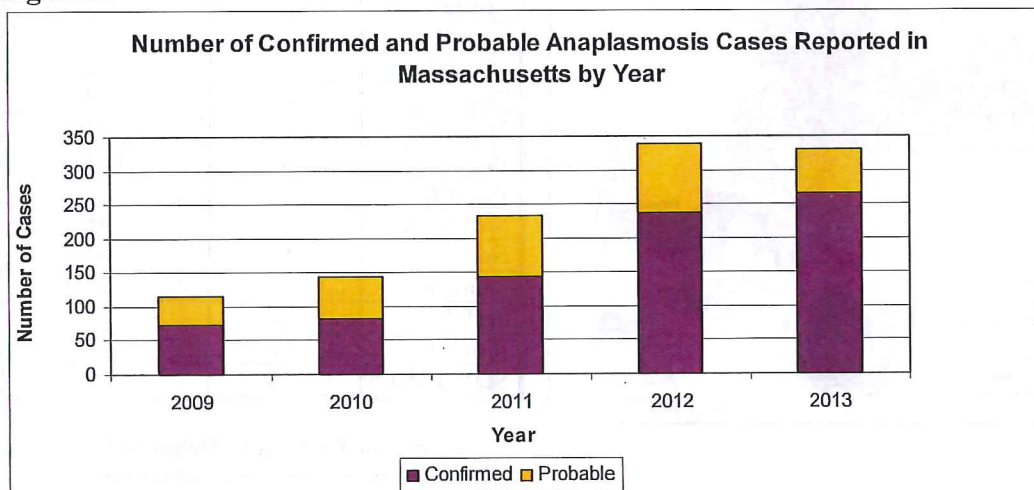


Figure 3.



Data as of 15APR2014 and are subject to change.

Physician Protection Act

In 2011, Massachusetts enacted Section 12DD, Chapter 112 of the General Laws, which protects the freedom of doctors to prescribe long-term antibiotic therapy for the treatment of Lyme disease.

Lyme Disease

SECTION 67. Chapter 112 of the General Laws is hereby amended by inserting after section 12CC the following section:-

Section 12DD.

(a) As used in this section, the following words shall have the following meanings unless the context clearly requires otherwise:

“Long-term antibiotic therapy”, the administration of oral, intramuscular or intravenous antibiotics singly or in combination, for periods of time in excess of 4 weeks.

“Lyme disease”, the clinical diagnosis of a patient by a physician licensed under section 2 of the presence of signs or symptoms compatible with acute infection with *Borrelia burgdorferi*; late stage, persistent or chronic infection with *Borrelia burgdorferi*; complications related to such infection; or with such other strains of *Borrelia* that become identified or recognized by the National Centers for Disease Control and Prevention as a cause of Lyme disease; provided, however, that “Lyme disease” shall also include an infection that meets the surveillance criteria set forth by the National Centers for Disease Control and Prevention and a clinical diagnosis of Lyme disease that does not meet the National Centers for Disease Control and Prevention surveillance criteria but presents other acute and chronic signs or symptoms of Lyme disease as determined by the treating physician; and provided further, that clinical diagnosis shall be based on knowledge obtained through medical history and physical examination only, or in conjunction with testing that provides supportive data for such clinical diagnosis.

(b) A licensed physician may prescribe, administer or dispense long-term antibiotic therapy for a therapeutic purpose to eliminate infection or to control a patient’s symptoms upon making a clinical diagnosis that the patient has Lyme disease or displays symptoms consistent with a clinical diagnosis of Lyme disease, if such clinical diagnosis and treatment are documented in the patient’s medical record by the prescribing licensed physician.

WHEN YOU FIND A TICK ATTACHED TO YOUR SKIN

REMOVE THE TICK PROPERLY USING FINE-TIPPED TWEEZERS OR A TICK-REMOVAL TOOL. (to avoid squeezing body)

Grasp at head-end close to the skin; pull with steady motion (no twisting).

2. THEN APPLY ANTISEPTIC
3. SAVE THE TICK (in sm zip-lock bag, plastic wrap, sm vial)
4. MAKE NOTE OF DATE ON CALENDAR
5. WATCH FOR EXPANDING RED RASH, SYMPTOMS OF ILLNESS (may develop over several days or weeks)

Notes:

Do not apply anything before removing the tick; may aggravate the tick, causing it to inject its contents and/or go deeper.

The reason for saving the tick is for identification and/or testing, if desired. It is important to know whether blacklegged tick (aka deer tick) or dog tick (aka wood tick). (www.tickencounter.org) Ticks may be professionally identified at Cape Cod Cooperative Extension (www.capecodextension.org); they may be tested for presence of bacteria at Lab of Medical Zoology, UMass (www.umass.edu/lmz).

An expanding red rash (aka *erythema migrans*) is symptomatic for Lyme disease, but many Lyme patients never develop the rash. (may or may not be 'bulls-eye')

If the tick is a blacklegged tick, enlarged/engorged, you may wish to seek medical advice re the merits of a prophylactic (preventive) dose of antibiotic. (doxycycline)

Most people develop an itchy red spot at site of bite. If the spot grows in size, or if symptoms of illness develop, medical attention should be sought without delay.

Further information, Barnstable County:

County Entomologist, Larry Dapsis - ldapsis@barnstablecounty.org 508-375-6642

County Public Health Nurse, Deirdre Arvidson, RN- darvidson@barnstablecounty.org 508-375-6617

Barnstable County Lyme--Tickborne Diseases Task Force 2014

Barnstable County Dept. Health & Environment

P.O. Box 427

Barnstable, MA 02630-0427

WHILE YOU WAIT A TICKET TO YOUR SKIN

REMOVE THE TICKET FROM THE TICKET MACHINE IMMEDIATELY AFTER YOU HAVE

ENTERED THE TICKET NUMBER ON THE TICKET MACHINE.

THE TICKET MACHINE WILL PRINT OUT THE TICKET IMMEDIATELY.

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